

In the Matter of Recommendations of the Independent Panel Reviewing the Impact of Hurricane Katrina on Communications Networks

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PG-12-19879

To: The Commission

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I have spent many years as a utility manager and engineer, involved in routine and emergency planning and operations. And, over the years, I have acquired a broad, basic background in radio telecommunications with respect to not only utility operations, but public safety as well, having also been employed as a public safety dispatcher while completing my education.¹

I wish to first thank the Commission for creating the Panel to examine the effects on telecommunications from perhaps the largest natural disaster experienced in United States history. And, for its own diligent, proactive work immediately after the event to issue Special Temporary Authorities (STAs) to individuals and agencies operating in the impacted area. Also, too, I would like to thank the Commission for the opportunity to contribute my comments on this important matter at this time.

It is necessary to carefully examine how the impact of this disastrous event on telecommunications could have been lessened to ease the burden upon society from future disasters of similar magnitude, should they occur. And, to examine the steps taken via telecommunications, or those in its absence, to rescue, comfort and reassure victims and to protect and preserve life and property from further injury until normal infrastructure once again functions. The time to make meaningful change to remove impediments and

¹ I hold Bachelors and Masters Degrees in Electrical Engineering, an FCC General Radiotelephone License, (originally a First Class Radiotelephone license obtained in 1965) and an Amateur Radio license continuously since 1961.

make proactive decisions is now, not after another 'lessons-learned' session from a future disaster.

In the following comments, I will attempt to focus primarily upon radio interoperability, since most other aspects of the event were adequately covered by the Panel and by its recommendations. And, upon observations of uses of low-power FM broadcast stations to provide public information during the crisis.

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I. The Interoperability Problem

1. The Panel spent a great deal of time concentrating on the logistics of restoration and assistance to what were, for the most part, for-profit telecommunications infrastructure while not sufficiently examining ways to establish effective temporary telecommunications facilities. In other words, not sufficiently dealing with the radio communications interoperability problem. The most notable example of that being a military helicopter dropping a message in a bottle to a responder on the ground as a means of communications.² I can think of nothing more embarrassing to the most developed and technically-sophisticated society on earth, other than perhaps bearing witness to thousands begging for food and water on national television from downtown New Orleans while the President of the United States travelled to Republican Party fundraisers in Arizona and California.³

2. While the Panel recommended that extra stocks of spare radio equipment be kept on hand for supplemental or replacement use, the momentous task of coordinating such stocks with respect to bands, frequencies and even modes cannot be understated. Unless such stocks are kept at least at the state, if not the federal level, there will be little assurance that future interoperability needs can or will be met. Also, unless such

² Appendix to FCC 06-83A at P. 26.

equipment is simple to operate, carefully coordinated, and channelized on standardized, pre-selected frequencies, unfamiliar users may be unable to properly use the supplemental equipment on a moment's notice.

3. There has been some discussion about use of alternative means, such as the Internet, for interoperability between radio units and systems on the different frequency bands and different modes. As is common knowledge, IP applications rely upon vulnerable, fixed-wireline and wireless carrier infrastructure being in place and operational, unless effected via satellite. Unless replacement IP networks and servers are also brought along, such suggestions are open to the uncertainty of availability of normal IP pathways; further complicating the situation by adding the need to establish or reestablish IP telecommunications as a key dependency for such interoperability.⁴ Also, such concepts further complicate and would, perhaps, delay critical communications following events until brought in and set up. Similarly, matrix adapters or multiple radio control panels for interconnecting single radios as a network are cumbersome and would require voluminous stocks of adapter cables to permit many different types and models of radio equipment to be connected. To say nothing of all the different antennas and support structures, power supplies, etc., to accommodate different radio units brought to the site by responders.

³ Cable News Network (CNN) coverage following Katrina

⁴ Appendix to FCC 06-83A at P. 26.

4. There is now an interest among public safety agencies in the use of digital communications modes, and attempts to standardize on a common format, known as APCO-25, to help assure interoperability among such radios of different manufacture.⁵ Also lured, perhaps, with the thoughts that such a mode change will make communications more secure and less likely to be received by the public.⁶ While this may be true, the military, the Coast Guard and non-public safety users such as amateur radio operators do not commonly use digital voice protocols, and would not likely convert their emission types to APCO-25 or some such. Therefore, irrespective of the proximity of frequency bands involved, interoperability will remain impeded and perhaps worsen with wider implementation of changes from analog to digital emission modes and mandatory changeover from 5kHz deviation to very narrowband, 2.5kHz deviation FM voice emissions.

5. Trunked radio systems, which the entirety of New Orleans relied upon, failed due to the disablement of the trunking controller. A classic case of single-point failure vulnerability. Radio systems should not be subject to a single point failure causing total collapse of a multichannel repeater system and loss of control point or dispatcher access. Especially a public or life-safety radio system. If this is characteristic of trunked systems in general, then trunked repeater systems should not be relied upon for public safety

⁵ Motorola and M/A Comm, for example, use different proprietary digital protocols, thus making interoperability impossible.

communications, especially in situations where immediate contact is necessary to prevent injury or loss of life.⁷ Only conventional, stand-alone mobile relay repeaters should be used for public and life safety applications. Preferably with generator-backed, uninterruptible power supplies so that even momentary interruptions could be avoided.

6. What was able to work, though, were distributed, simplex radios. Reliance upon existing infrastructure has been shown to be ineffective or even catastrophic. Not only in Katrina's aftermath, but also following Hurricane Charlie in Port Charlotte, FL. And, immediately after the World Trade Center attacks in New York City.⁸ Amateur radio operators were able to provide communications with military and Coast Guard responders in the New Orleans area thanks in-part to the frequency agility and emission compatibility of their VHF radio equipment. Existing restrictions on Part 90 equipment forbid front-panel frequency programmability for public safety

⁶ In order to intercept digital communications, receivers must be capable of decoding the specific protocol used.

⁷ NFPA 1221, Standards for the Installation, Maintenance and Use of Emergency Services Communication Systems requires public-safety trunked radio systems, on failure, to revert to conventional repeater systems. This did not occur in New Orleans, following loss of the trunked central controller. (National Fire Protection Association)

radios and should be revised to allow at least keyboard frequency programmability for VHF high-band portables licensed to public safety agencies.⁹ And, as was mentioned above, retain 5kHz deviation FM voice emission capabilities so as to permit maximum interoperability capability.

7. The planned rollout of 700MHz spectrum will do little to solve the interoperability problem between units of agencies not from the immediate area or within the state. Especially since not all public safety agencies will be able to afford the luxury of scrapping perfectly good, in-place (and in some cases, superior-coverage) radio

systems to occupy 700MHz allocations.¹⁰ And, this would not address the remaining interoperability problem with the military, the Coast Guard, several relief agencies, and amateur radio operators.

8. The Internet should not be depended upon as a means to improve interoperability of radio systems if those systems are expected to be operational following a major event such as an earthquake, large fire or Hurricane. The reasons are obvious. Loss of overhead and underground telecommunications pathways will occur, disconnecting what were the means

⁸ Port Charlotte Police were unable to use their trunked system and had to deploy an old VHF repeater system following Hurricane Charlie in 2004. Following the World Trade Center collapse, interoperability was difficult due to disparate modes.

⁹ 47CFR90.203(e)

to interconnect such systems. Fixed satellite and/or microwave terminal interconnection points would also be vulnerable to the effects of such events.

9. The most effective means to achieve interoperability of all responders would be to

select a frequency band that could be used with as much existing radio communications infrastructure as is possible, and where not, provide a sufficient supply of supplemental portable, cross-band mobile relay units for deployment in the affected area. Ideally, high-band VHF spectrum, employing conventional 5 kHz deviation FM voice emission, would be the best choice since it is used by the military, Coast Guard, public safety, the Amateur Radio Service, the Civil Air Patrol, and other federal agencies.¹¹ To address this need, I have filed a Petition for Rulemaking, proposing the creation of the National Emergency Administrative Radio System on June 26, 2006. A copy of the Petition is included as an Appendix to this filing.

10. There is an existing radio service, the Shared Resources radio system (SHARES) that has been created to provide regional and national interoperability. It consists of a network of state and federal government, military, industry and relief-agency participants that can interoperate via

¹⁰ It has long been recognized that in rural and remote locations, low-band VHF has superior coverage when compared to 800 or 900MHz systems, assuming no additional base or repeater site additions to existing systems.

¹¹ Ideally, spectrum should be located adjacent to existing allocations so as to permit services to select frequencies that are capable of being used by existing equipment. The 148 to 150MHz band, now exclusively for federal and military users, would meet this need.

numerous high-frequency channels. This service did function during the aftermath of Katrina, and should be an example of a model to be followed in achieving interoperability at the local and even responder level. Selection of a band or even just a few channels of high-band VHF allocation would permit achievement of a similar level of interoperability if those channels could be easily selected by a broad range of users.

11. The Military Affiliate Radio System (MARS) is an existing system composed of civilian amateur radio operators and military stations and operators. This service supports and makes up the amateur and military station members of the SHARES service. MARS now is a user of the 148-150MHz spectrum and serves as an example of existing interoperability between the military and amateur radio operators.

12. The Amateur Radio Service has responded to assist in the aftermath of Katrina as it has in virtually all major disasters around the world. The successful use of amateur radio as an interoperability solution depends upon the availability and capabilities of its users. Over the last 30 years in the United States, there have been few community subdivisions, if any at all, that have been created without Conditions, Covenants and Restrictions (CC&Rs). Virtually all of these deed restrictions contain restraints or outright prohibitions on the installation of any type of outside antenna. Even simple, unobtrusive wire antennas are prohibited, for the most part, within

the communities. With the advent of the direct satellite television and two-way, over-the-air Internet, the Commission saw fit to enact rules to pre-empt CC&Rs to permit use of reasonable outside antennas.¹² In order to help ensure that sufficient amateur radio operators will be available to provide emergency interoperability in the aftermath of future disasters, the Commission should extend the same pre-emption, in concept, to the Amateur Radio Service. Without at least the pre-emption of CC&Rs for simple wire antennas, the Amateur Radio Service, MARS, and SHARES will be increasingly impeded and eventually unable to respond as they now can due to fewer and fewer amateur radio operators at fixed locations. Further, even if mobile amateur radio stations are able to operate within an affected area, fixed stations with effective antennas at distant locations would still be needed for sustainable, reliable telecommunications to and from those mobile units.

II. Public Information Broadcasts

13. The receipt of public information and instructions in the aftermath of large disasters can save lives and prevent additional or aggravated injuries and damage to property. Public information could have been supplied much more effectively following Katrina by the deployment of temporary, low-power, portable FM broadcast stations to replace inoperable broadcast

¹² 47CFR§1.4000

stations. An example of such a station was set up near the Houston Astrodome for refugees and quickly given an STA by the Commission Staff. Consideration should be given to packaging similar hardware for quick deployment in future emergencies with pre-existing licenses or automatic, emergency STAs. Perhaps small, self-sustainable, battery/solar-powered transmitters and attached antennas that could be placed in optimum-coverage, elevated locations with low-power wireless remote links to enable flexibility in selecting control points and/or portable studio locations. The public could be notified in advance, as was done with yesteryear's CONELRAD system, to tune to pre-determined, common national frequencies to receive important information if local broadcasters are inoperative.¹³

III. Suggested Changes to Rules and Regulations

14. The ability to select frequencies via a front panel, direct-entry keypad is a critical need in times of major disasters. In spite of the best intentions of storing pre-selected frequency radios ahead of time, sufficient stocks may not be all available when needed. Obviously, there is a myriad of possible adverse consequences that could result in insufficient availability of those

¹³ An in-place low power FM station in Bay St. Louis, MS, WQRZ-LP-FM, 103.5, was on the air and the only station on the air after the storm hit in Hancock County, MS. This was made possible since the station used 12Volt automotive batteries for its emergency power source and was easily relocated. The station was used by the County Emergency Operations Center to broadcast public information. (*QST Magazine*, August 2006, P.67)

stocks such as damage or destruction of the equipment itself by the effects of the disaster. As such, an additional paragraph should be added to certification requirements at 47CFR90.203(h)(3) to exempt front panel frequency selection restrictions on public safety radio equipment. The paragraph should read as follows: “*The radio equipment is licensed to local or state governments for use in conjunction with regional or national disaster operations.*”

15. There is a great deal of ambiguity surrounding existing regulations that permit amateur radio operators to utilize frequencies not assigned to the Amateur Radio Service during the aftermath of disasters such as Katrina. Existing rule 47CFR§97.401(a), for example, permits an amateur station to make transmissions necessary to meet essential communication needs and facilitate relief actions. However, this rule is not specific as to limitations on frequency selection and emission types; whether operation is permitted outside of amateur bands; or even whether amateur operators may use of modes and power levels not permitted by their class of license.

47CFR§97.403, on the other hand, deals with this issue, but somewhat vaguely. It states that “no provision of these rules prevents the use by an amateur station of any means of radiocommunication at its disposal to provide essential communication needs in connection with the immediate safety of human life and immediate protection of property when normal communication systems are not available.” I would like to suggest further

clarification of 47CFR§97.403 as follows: *“(a) No provision of these rules prevents the use by an amateur radio station of any means of radiocommunication at its disposal, including operation on frequencies not normally assigned to the amateur radio service, so that the amateur station may provide essential communication needs in connection with the immediate safety of human life and immediate protection of property when normal communication systems are not available.*

(b) Under the above circumstances, an amateur station may use any emission type or transmitter output power necessary to establish and maintain effective communications irrespective of limitations by amateur license classification.

(c) Amateur radio stations may communicate directly with other licensed or authorized stations on assigned amateur radio frequency bands and on other frequencies as needed during such emergency situations.”

16. Pre-emption of CC&Rs for amateur radio antennas of reasonable size will be necessary to ensure the future availability of amateur radio as part of an interoperability solution. 47CFR§1.4000(a)(1)(v) should be added as follows: *“A wire antenna used to receive and transmit fixed wireless signals in the Amateur Radio Service.”* Further, 47CFR§1.4000(a)(2) should be revised to read as follows: *“For purposes of this section, ‘fixed wireless signals’ means any communications signals transmitted via wireless technology to and/or from a fixed customer location. Fixed wireless signals do*

not include, among other things, AM radio, FM radio, Citizen's Band (CB) radio, and Digital Audio Radio Service (DARS) signals.”

IV. Summary and Final Comments

16. I would encourage the Commission to make meaningful changes to address the lessons-learned from the Katrina crisis. I also would hope that the Commission gives significant weight to comments provided. And, not just from the commissioned Panel, but from others as well. Notably absent from the Panel were representatives from the military, the Coast Guard and the Amateur Radio Service. Also absent were representatives from Southern Baptist Relief, the Salvation Army, and the Red Cross. These entities all utilized radio communications to assist in the aftermath, yet were not represented on the Panel. Their input and recommendations could have added weight and value and perhaps identified further interoperability issues and solutions that were not addressed. It is interesting to note that the vendor of the New Orleans trunked radio system that failed, M/A Communications, was also absent the Panel. Yet a competitor, Motorola was appointed as a member. A detailed explanation of the apparent susceptibility of trunked radio systems to single-point failure should have been a key component of the Panel's interoperability agenda and was not. Especially since trunked systems will be likely the central focus of 700MHz equipment proposals.

17. As of this writing, the United States House of Representatives has passed H.R. 5852, the 21st Century Emergency Communications Act of 2006. This Act is focused on improving interoperability of first responders. Its author, the Honorable David G. Reichert (R-WA), is a former first responder who is only too familiar with interoperability pitfalls. No where in that Act is 700MHz offered as a “wholesale fix” to the interoperability problem. Instead, the Act focuses on needed up-front planning as a means to address and solve the problem. Not the wholesale replacement of perfectly good, in-place radio systems that would cost hard-pressed state and local governments millions upon millions of taxpayer dollars and still not achieve a solution to the problems experienced following Katrina. Or worse: Replace robust, hardened, superior-coverage conventional mobile relay and remote base radio systems with single-point-failure-prone trunked radio systems.

18. I would like to encourage the Commission to actively participate in the Department of Homeland Security planning process commissioned by H.R. 5852, and, that the Commission’s highest priority be the consideration of simple, robust, conventional radio systems that have proven reliability when all else fails. Especially equipment which can be quickly set up; is solar/battery powered; can bridge between different radio bands and emission types to a set of common, VHF high-band channels (the core concept of the NEARS Petition); and can be quickly deployable as pre-packaged units.

19. The Commission should revise regulations as I have suggested to further facilitate interoperability and to help ensure that the Amateur Radio Service will be available to assist in the aftermath of future disasters. It is an integral part of the staffing of the Military Affiliate Radio System; the Shared Resources Radio System; the Salvation Army Team Emergency Radio Network; the Red Cross; and Southern Baptist Relief. All of these entities assisted in the aftermath of Hurricane Katrina and would have been impaired without it. Unless some regulatory relief is soon achieved allowing placement of simple, unobtrusive outside antennas at fixed station locations, at some point in the future, the Amateur Radio Service will cease to exist.

Respectfully Submitted,

/s/

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APPENDIX

PROPOSAL TO CREATE THE NATIONAL EMERGENCY ADMINISTRATIVE RADIO SYSTEM

**Before the
Federal Communications Commission
Washington, D.C. 20554**

In the Matter of a Proposal to Create a
National Emergency Administrative
Radio Service (NEARS)

RM No. _____

By W. Lee McVey

To: The Commission

PETITION FOR RULEMAKING

As a long time licensee of the Commission in both Amateur and Commercial facets of telecommunications, I offer the following proposal. Its consideration and adoption will require the concurrence of the National Telecommunications and Information Administration (NTIA), Department of Commerce, as it proposes creation of a new radio service in the interest of public health, safety and security.

I. Proposal

1. This Petition proposes the creation of a new radio service, the National Emergency Administrative Radio Service (NEARS), to fulfill, in part, the requirements of the National Security and Emergency Planning and Execution directives at 47CFR§202.3(a) and (b).
2. A service called SHARES, the Shared Resources High Frequency Network, was created by NTIA and the Commission to facilitate intercommunication during and following national emergencies at the state and regional level. While the SHARES role is regional and strategic, there is no similar local, area-focused service that exists to meet the demonstrated intercommunication need at the individual unit or responder level.
3. The purpose of this service, and the spectrum set aside for it, would be to facilitate interoperability between military, federal, state and local government public safety and aid officials and individual responders during and immediately following national emergencies. The proposal will require the assignment of a portion, if not all, of the 148 to 150 MHz radio spectrum, now assigned

exclusively to the federal government¹⁴, for use by a fleet of state or federal government-authorized flexible, analog FM two-way radios and associated portable, mobile relay systems to enable extended range operation.

II. Background

4. The experience of several severe national emergencies has shown all of us the frail, non-robust nature of modern two-way telecommunications systems. Both wireless and wireline.

5. It is common knowledge that during and after massive national-scale catastrophes such as hurricanes, earthquakes, and terrorist acts, normal communication means are often times damaged or destroyed contributing to further-aggravated damage, injury and loss of life. If not completely destroyed, damaged to the extent that they cannot be depended upon or are insufficiently available to those whose responsibilities are to save lives by responding to the injured or those yet in harm's way. And, to those in our

The segment is now utilized by the Civil Air Patrol (CAP), the Military Affiliate Radio System, NASA, and some military facilities for routine communications. Both the CAP and MARS uses now support the intent and purpose of this Petition as much of their operations involve military and public safety, health and welfare. MARS is an active participant in the SHARES system. MARS operators are, for the most part, licensed Amateur Radio operators.

military, National Guard, federal agencies, state and local public safety officials, and health and welfare agencies responding to calls for additional assistance.

6. Telecommunications infrastructure is often reduced to merely two-way radio-equipped mobile units of the same fleet capable of talking unit-to-unit. As was the case not only in New Orleans, but in Port Charlotte, Florida, following hurricane Charlie, and following the events of September 11, 2001, in New York City.

7. The single-point vulnerability and sequestered nature of so-called state-of-the-art trunked radio mobile-relay systems are common knowledge. The loss of the trunking controller in New Orleans, for example, made their extensive mobile-relay trunked system useless. Port Charlotte's system was severely damaged and unusable as well, following hurricane Charlie. And, in the case of New York City, different systems, different protocols, and sheer numbers of responders made interoperability nearly impossible.

8. Most recently, not only was the New Orleans system itself useless, but incoming units from the military, Coast Guard and a multiplicity of other state, local and federal agencies from other areas could not effectively intercommunicate and interoperate due to the myriad of different radio band and frequency assignments. To say nothing of those who came with digital

protocol feature radios, further complicating the situation. Only a few military units, the Coast Guard and available amateur radio operators were able to interoperate effectively for this reason, thanks to frequency agility and proximity of assigned spectrum.

9. The Commission's proposed new 700MHz public safety allocation is not a solution, either. Due to the massive expense involved with moving agencies to this band, and the propagation, coverage vulnerabilities, and system losses at such high frequencies make the band not desirable to agencies in mountainous or remote terrain, such as exists in some of the Western and Mid-Western states and the Northeast.

10. Even if all regional public safety agencies were to agree to relocate to 700MHz, for example, the military, National Guard and the Coast Guard would not be universally equipped with radio equipment that would operate on any frequencies or modes involved as their mobile, base and person-to-person operations are conducted primarily on a portion of the high-band VHF spectrum from 148 to 174MHz using analog, narrow-band FM voice.

11. In order to meet this need, both spectrum and mode should be selected that are presently in use somewhat universally or can be easily used with commercial equipment; and, that is close enough to present allocations that other services, including the military, the National Guard and the Coast

Guard can select frequencies within such a segment capable of use with their existing equipment. The 148 to 150MHz spectrum would be ideal for such a purpose, using 5kHz narrow-band, analog FM voice as the mode.

12. The 148 to 150MHz band is currently only sparsely used by federal agencies and is within 10 MHz of public safety allocations, the maritime service, and the 144 to 148MHz Amateur Radio Service allocation. Most modern commercial radio equipment, now type-accepted for use under Part 90, is capable of operation from roughly 140MHz to 170MHz without significant internal retuning. In addition, Coast Guard and military units are equipped with radios operating below 160MHz as well, offering direct keyboard frequency-entry-capability in the 148-150MHz segment. Amateur radio operators, by virtue of their adjacent allocation and direct keyboard frequency entry could similarly operate within this segment, if necessary, as they do now on HF frequencies as key participants in the SHARES system and the Military Affiliate Radio System (MARS). Most existing VHF MARS operations are already within the 148 to 150MHz segment.

13. Beside the need to designate an allocation and perhaps shift existing users somewhat, depending on the amount of spectrum needed for NEARS, a change to existing regulations would be desirable to permit type-acceptance of keyboard-frequency-programmable radios for optimum flexibility for NEARS users.

14. There exist several relatively inexpensive radios manufactured by Motorola, Inc., for export use, that already incorporate keyboard programmability. The GP-68, GP-338 and JT-1000 models are three handheld radio examples that come to mind. There are other similar products made by others for use by our military and internationally that also possess direct keyboard frequency entry capability.

15. Creation of NEARS would not require wholesale retooling or a lengthy and complicated coordination process, since not many channels would be needed for such a service. Frequencies or a frequency band incorporating sufficient separation for mobile relays could be interspersed between existing users. Selected so as to avoid NTIA's already-coordinated uses by CAP, NASA, and MARS, for example.

16. The cost to the government would be minimized by virtue of the compatibility of most, if not all government service radio equipment that would be involved in emergency operations, including the military. State and local public safety entities may need to purchase additional, frequency-agile equipment, or could easily modify existing high band VHF equipment to operate on all of the frequencies selected for interoperability in this band.

17. Creation of this service would fulfill the need for immediate affected area interoperability of communications following crises. Even though regulations do permit use of unassigned service frequencies in emergencies, the lack of physical equipment on hand to enable such operation has left emergency responders without the needed means to do so.

18. While it was laudable, perhaps even Herculean, for the Commission Staff to have relocated temporarily near New Orleans in order to grant Special Temporary Authority to operate mobile and relay stations not licensed for the area in the aftermath of Katrina, such authority didn't provide the additional radio hardware with which to intercommunicate with other agencies. This proposal, if adopted, would permit the advance frequency coordination, licensure and availability of the equipment to be used for such purposes so that future responses to national emergencies could be much more effective.

19. This matter is urgent, and deserves the immediate attention of the Commission as its consideration and implementation may lessen adverse consequences following future national emergencies.

I wish to thank the Commission in advance for the opportunity to submit this Petition and await its response.

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